

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 17-18 and 22, and ADD new claims 25-27 in accordance with the following:

Claims 1-16 (Cancelled):

Claim 17 (Currently Amended): An apparatus for providing a tracking error signal for an optical disk recording track, comprising:

- a plurality of optical detectors each of which generates an electrical signal,
- a matrix circuit which selects and adds said electrical signals in pairs to output at least one matrixed signal, each said pair corresponding to optical information detected along a line diagonal to ~~said~~the optical disk recording track;
- a circuit which binarizes each matrixed signal;
- a phase lock loop circuit receiving a first clock signal having a higher frequency than the matrixed signals and each matrixed signal, the phase lock loop circuit outputting second and third clock signals synchronized with the respective matrixed signals and having the same frequency as the first clock signal; and
- a phase detector which compares a phase of the second synchronized clock signal with a phase of the third synchronized clock signal to generate the tracking error signal, wherein the tracking error signal is independent of a length of pits and/or marks on the optical disk recording track.

Claim 18 (Currently Amended): The apparatus as claimed in claim 17, further comprising first and second equalizers which increase a high frequency component of respective ones of the matrixed signals prior to respectively binarizing ~~said~~the matrixed signals.

Claims 19-21 (Cancelled):

Claim 22 (Currently Amended): A tracking error detecting apparatus to produce a tracking error signal as a difference signal of optical detection signals generated by a plurality of optical detectors, the apparatus comprising:

- a plurality of binarizers which binarize each of the optical detection signals;
- a plurality of phase locked loops which ~~each~~ generate clock signals synchronized with each of the outputs of the plurality of binarizers;
- a phase difference detector which detects a phase difference between the generated clock signals output from the plurality of phase locked loops and generates phase difference signals; and
- low-pass filters which filter the ~~outputs of~~ phase difference signals output from the phase difference detector to output the result as the tracking error signal.

Claim 23 (Previously Presented): The tracking error detecting apparatus as claimed in claim 22, further comprising equalizers which reinforce high-frequency components of the optical detection signals and output the results to the binarizers.

Claim 24 (Previously Presented): The tracking error detecting apparatus as claimed in claim 22, wherein a clock signal provided to the phase locked loops is a channel clock signal.

Claim 25 (New): A tracking error detecting apparatus for generating a tracking error signal, comprising:

- an optical detection unit having a plurality of optical detectors to generate optical detection signals;
- a matrix circuit arranged to select and add the optical detection signals in pairs, and generate summation signals based on the optical detection signals generated by the optical detectors which are positioned along a diagonal line from a track center of a recording track on an optical disk;
- a binary circuit arranged to convert the summation signals into binary digital signals;

a phase lock loop (PLL) circuit driven by a predetermined channel clock to generate clock signals synchronized with each of the binary digital signals;

a phase-difference detector arranged to detect a phase difference of synchronized clock signals and generate phase difference signals which are used to obtain a tracking error signal that is independent of a length of pits and/or marks recorded on the optical disk.

Claim 26 (New): The tracking error detecting apparatus as claimed in claim 25, further comprising equalizers arranged to reinforce high frequency components of the summation signals prior to performing binarization.

Claim 27 (New): The tracking error detecting apparatus as claimed in claim 25, wherein the phase difference between the synchronized clock signals is obtained every clock cycle of the predetermined channel clock regardless of the length of pits and/or marks recorded on the optical disk.